Ala Wai FRM Public Workshop 7/28/22

Meeting purpose: A virtual workshop held on 7/26/2022 and an in-person workshop held on 7/28/22 presented the initial array of alternative plans. The recording of the virtual workshop was provided on the project website, www.honolulu.gov/AlaWai (public engagement tab). A copy of the presentation is provided in Attachment 1, with captured chat in Attachment 2.

Q = Question/Comment
A = Answer/Response

Discussion:

- Rank the alternatives presented today
- Provide feedback on alternatives
    - Why did you rank them this way?
    - Why do you prefer some over others?
    - What do you like or dislike about any/all of the alternatives?
- Q (Dave Smith): Where is the flooding?
- Q (Laura Sanchez [Neighborhood Board #5]): When showing the map, there is a line going from the Ala Wai Canal to Kapahulu, and then to the ocean down Kapahulu. Also another line down Paki Ave. Please elaborate.
    - A: Everything is conceptual
- Q (Paul Cynn): I'm the person who proposed Alternative 2C, the dual outlet system. Idea is for a dual outlet system while eliminating pollution. There would be dual gates on each end of the canal. When it's low tide, open up the Kapahulu Gate. When it's high tide, close the Kapahulu gate and open the harbor gate. This way all the water would flow out towards the harbor. There isn't very much tide in Hawaii; king tides is 4-5'. With the width and length of canal, that would be equivalent to the amount of water coming in and out twice a day.
    - A: Every measure we talk about has to be related to flood risk management, but there are opportunities to get secondary benefits. For example, we can benefit with water quality using some of the measures, i.e. storage. Similarly, there are opportunities to leverage a secondary outlet to improve water quality. We can also add things on with a Locally Preferred Plan (LPP).
- Q (Catherine): Seems like plans are from the top down. Are you considering sea level rise or coastal storm surge?
    - A: This study is for flood risk management, meaning riverine flooding or flooding from the mauka side. Riverine flooding is influenced by tidal processes, sea level rise, storm surge, etc. We incorporate those things into sea level rise so we look at what sea level risk would look like in 50 years, and build alternatives with that in consideration.
    - Under the flood risk management authority we are unable to build a purely coastal measure (i.e. something that builds against coastal storm risk) alone.

- Q: Waikiki mgmt. plan – Is this a comprehensive plan that's in consideration with those other plans?
- Q (Julian): Could you give us a visualization of what floodwalls will look like? There's concern for along the canal what those floodwalls will look like, impacts on tourism and people walking by.
    - A: We understand the importance of aesthetics for floodwalls. We are looking into not just putting up a concrete wall that's gray. The team will consider ways to make it look nicer. Or even different types of floodwalls (i.e. retractable).
- Q (Julian): Of all these alternatives could you put a $ on each of the alternatives? That might be one way of decision making on your part?
    - A: Team is actively working to develop costs for each of these measures.
- Q: Floodwalls along Manoa Stream, there's another stream that goes under Marco Polo?
    - A: That area is an outlet for storm water taking it to the canal. We would make sure any floodwalls wouldn't impact any flooding there. We are also constrained by a 800 cfs rule, meaning that streams need to be a certain size (the flow needs to exceed 800 cubic feet per second [cfs; flow rate] at a 10 year event) for us to be able to implement any measures such as floodwalls there. Since that stream is small, it doesn't qualify under this rule. But if we can effectively pump water out or move water out quicker, or put a flap gate out there, we can prevent backwater from flooding. Anything done to the ditch will also need to benefit the canal.
- Sharing ranking – participants share their most preferred and least preferred alternatives
    - Franklin Chung – supports the 2 alternatives that have golf course as detention, would love for federal $ to go into the golf course. Prefers an earthen embankment and keeping the golf course as is (not as a marsh or wetland). The Tunnel is least favorite.
    - Janet – supports using for Ala Wai golf course for storage. Also supports natural & nature based, utilizing existing infrastructure (Woodlawn Bridge), Palolo channel modification. Floodwalls are least favorite, especially near the canal.
    - Julian – Liked Alternative #4. Hybrid cornerstone is most feasible.
    - Valerie – Golf course detention – doesn't want view blocked. Tunnel with a running track.
    - Vanessa – Prefers the natural & nature based alternative. Think of social equity of Kaimuki High School – would we place this same measure at a private school.
    - Dave Watase – no to anything in Palolo (no damages in Palolo; most damages are Koali road area). SWIFT - against going into ocean ¼ miles; will impact reef. Their plan is $180M without going ¼ mile into the ocean.
        - Prefers SWIFT tunnels – consolidate tunnels to golf course and then to harbor. Take Makiki down Pensacola/Roosevelt High School and exit at harbor. Don't go directly to ocean. Tunnels are cost effective; don't need walls or bypasses. Save 3 bridges – Lowery, Woodlawn, and ?
        - Detention of golf course – make it multi-tier so no need clean entire golf course when it storms

        - Put flood pump connecting pipes so if you don't have gravity flow you could still empty and intercept tunnels and pump it out to the ocean.
        - Flood gate at Ala Moana bridge will protect us from sea level rise and tide surges. You can put all the floodwalls you want around Ala Wai canal; when you have a 2-3' surge, it's going to breach it anyways. Also with floodwalls you will have to cap the existing storm drainage system. There are over 50 storm drains; the bigger ones need pump stations.
        - Makiki stream would need gate, pump, or bypass. Other big conduit that would probably need to be pumped. Kalakaua was flooded – Waikiki flooded but storm drains were still working. If you cap the drains, everywhere else is going to flood.
        - A: We do incorporate sea level rise into our plans. Our Future Without Project (FWOP) conditions does capture effects of sea level rise.
- Q (Karin): Each alternative is looking at conceptual standalone. Are you considering ongoing maintenance of each? If you build tunnels, there's a maintenance detail that goes with that. If you do nature based, then forestation needs to be continual.
    - A: USACE cost shares the project with a local sponsor. O&M is the responsibility of the local sponsor into perpetuity. Those O&M costs are rolled into the total project cost, so we can look at which alternative from an economic standpoint. Anything constructed will have an O&M plan
- Q (Sidney): Have you looked at channel modifications (i.e. deepening) along Manoa stream? Is the area by Chinese cemetery housing being considered?
    - A: There was a detention basin incorporated there in the previous feasibility plan. Right now we're not considering that.
- Q (Dave W): Look at the Woodlawn Ditch entry angle. The Woodlawn Ditch hits Manoa Stream at a 90 degree angle.
    - A: We looked at that area and we have it on our radar.
- Q (Dave W): Look to deepen Manoa stream near Kanewai Park instead of a floodwall. That area is at a high elevation, you could probably drop it a few feet. There's a 10' drop near Kanewai Park, you could probably deepen it there.
- Q (Franklin): What are the discussions with golf course?
    - A: We're still early in conceptual plan
- Q (Vanessa): To what extent are you engaging the native Hawaiian community? Are you working together with Hawaiian groups?
    - A: We try to create a robust community engagement plan and will also engage under Section 106.
- Q (Karin): Ala Wai floodwall is listed on every array, which makes it sound like no matter what happens, most likely there will be some sort of floodwall around the canal. Is there a way around doing floodwalls?
    - A: Floodwall is in all the alternatives, that's because there's so much potential flood risk in the entire lower watershed – McCully, Moiliili, Waikiki. We're going to have to do something, so the solution in this area needs to be fairly substantial.

- Q (Drew): #98 says it's a dam; #209 says it's a detention basins. It might not coincide with any of the 7 plans. Since it's still under consideration – what is your take?
    - A: In the previous study there were in-stream dams. Those were very controversial as it affected cultural resources, utilized private properties, and had environmental effects. There's a reason those were not very popular. We are looking to utilize existing green areas. Dams have not been completely screened out yet. Also under comprehensive benefits the goal is to maximize existing green spaces. If we can get the same amount of storage from other areas, we'll look at those first. The previous dams were not found to be as effective as they initially were thought to be. For those reasons, we're not looking at holding water further up in the watershed, so we're looking at other areas where we can.
- Q (Sidney): The original plan was for 100 year flood; at a 50 year flood those dams could work for you.
    - A (Eric): Benefits of those dams don't go as far downstream; Woodlawn bridge backs up at events far less than 100 year. We haven't gone in and done a full analysis due to impacts to cultural resources, environmental impacts. We have not fully screened those out yet; we're just looking for other features that might provide the same benefits.
    - A (Kelley): The previous effort was for the 100 year. One of the reasons we haven't screened it out is because there's so many other constrictions, so the effects don't go very far downstream. We really haven't been modeling it because we feel we can do other more cost effective, recreational items.
    - A (Eric) – Also, there's varying types of risk – flood risk, residual risk. Risks of utilizing public parks for detention areas, how quickly it fills up. There's also risks for dams, if that dam fails, there's risk downstream. That is also something the team is considering. The team feels there's other measures that can be just as effective without as much risk.
- Q (Valerie): For comparison sake what type of flood event was the 2004 flood?
    - A: Between a 25-50.
- Q (Dave W): Concern for detention basins – if not designed for biggest storm and you build something smaller, then when a bigger storm comes, the detention basin becomes inadequate and overtops. Even with a spillway, there's still a potential for earthen berm to breach.
    - A: This is part of the risks. We have design criteria, so when we design something for a 50 year storm, we see how it holds up under a higher storm. We look at life safety risk. We have a Quantitative Risk Assessment where we put experts together in a room and look at the risks whether it will fail. And if the answer is no, then we don't design it. So we go thru a process to identify all the risks. In an urban area there's more risks than in rural areas.
- Q (Valerie): Like tunnels, likes making streams deeper, likes maintenance. Does not like walls. No matter how many walls we have or how deep we make things, a big factor of the flooding is the debris. If there's anyone from the City or State that can get groups together to help clean up the debris that feeds into the Ala Wai that would be great.
    - A: team is actively looking at ways to reduce debris.

- Q (Kahealani): Native Hawaiian population went with aloha aina effort. Daughter's school went to legislature to protest against detention basins. Glad team is not considering detention basins. Native Hawaiian's are here to protect the land. We want you to know that there is currently a detention basin in Kalawahine basin. The stream needs to meet a certain criteria – ours doesn't meet that criteria, but they still built a huge detention basin. DHHL hasn't maintained it in 20 years so it is all filled in. It clogged up and is not operational anymore. The Hawaiian homestead next to it is eroding. They are covering the detention basin with dirt, put a pipe, so if it does rain, then water can come out. Instead of restoring stream, they are just covering it up. That's one of the things that's happening. Our houses are falling because of the decisions that are being made. So glad so many people from different parts of the watershed – working with POAWW – it really helped all of us to understand better how to engage and be present at these types of meetings. We want to know that our aina will be in good hands for the children.
- Q (Valerie): Hurricane season – pray for ocean water to be cold; whereas gulf water is warm so they get hit all the time. With global warming, the 100 year or the 50 year will become more frequent. Not sure how long ocean temperature will stay the way it is.
    - A: We look out to 100 years for climate change; for planning purposes we use a 50 year horizon. There will be a detailed write up on climate change.
- Q (Janet): Something that is not included – cannot keep increasing the impervious surfaces in Ala Wai watershed. So much building has been around the slopes surrounding the area.
    - A (Haku): The City has permit requirements that force developers not to increase runoff. DFM is implementing a stormwater utility program that incentives homeowners to reduce runoff.
- Q (Vanessa): Which alternative uses the least amount of concrete?
    - A: Utilizing parks will utilize grass berms. If we did detention at Manoa Valley District Park, it could be grass berms that you can walk on and also use as stadium seating. We've been working with City to make sure parks maintain functional for recreation. Existing infrastructure is also less intrusive.
- Q: It's not just a "seeing" aspect, it's also impact on environment.
    - A: We're not the first team to look at this. Team is trying to utilize existing space because it has a lower impact on the watershed.
- Q (Sidney): Developers tasked with making sure they have to watch how much runoff? What about private homeowners? In palolo you see so many homeowners with wall to wall concrete.
    - A (Haku): Can't speak for DPP, but when you develop a property, you're not allowed to increase the amount of runoff; the storm system was not designed that way. Individual homeowners are responsible for that. DPP is cracking down on illegal development. They're reliant on the community to point those out.
- Q (Beverly): Will Board of Water Supply increase fees based on amount of concrete
    - A (Dawn/DFM): That's a proposal from DFM.
- Q: Would a detention basin by itself be effective?

    - A: Some detention will be effective. Within each subbasin you can have different design levels if don't need as much protection
- Q (Vanessa): Can you go deeper instead of floodwalls?
    - A: Alt 2B has dredging the canal so floodwalls don't have to be as high. Also has bypasses. If we get water out in other ways then walls don't have to be as high. We just haven't modeled it as a system yet.
- Q (Beverly): Will there be a containment center in Palolo?
    - A: There's Palolo Valley District Park which is challenging because the elevation is so high.
    - Q: The retaining wall is right behind my house. When we first moved in we could look straight across the park. Now you would have to climb the roof to see the park. Trucks kept moving boulders, soil, and building the park up high. Every time they built that park up, we all lost land.
    - A: The team is looking at little strip between Palolo park and the stream.
- Q: Palolo: From 9th Ave, the ground gradually goes down. Never experience flooding for last 60 years. But there are some areas in Palolo where as you go deeper, the elevation is higher.
- Q: What's difference between bypass and tunnel?
    - A: Tunnel will be 10-15' diameter tunnel that goes deep underground. A bypass is more like a culvert, utilizing existing storm drains. We would just expand the size of the storm water drainage pipes.
    - Q: Are bypasses where there's existing pipes? And tunnels you're starting from scratch?
    - A: Yes, tunnels are down and out to the ocean
- Q (Dave W): Manoa Valley District Park detention basin – what volume of water looking at storing there
    - A (Kelley): 50 acre feet
    - Detention basins in feasibility study held over 100 acre feet. There's so much water that ends up at the canal; detention basin likely can't hold all that water. But it could reduce risks. There's local and watershed wide benefits.
- Q: How to get that storage? By digging?
    - A: Building up and excavating. Other multipurpose parks within the nation looks like a field with berms around it. It is only used as storage for huge storms. It uses gravity flow so no pumps.
- Q (Sidney): Concerns for walls around park
    - A: We would try to make it as least impactful as possible. You could make it more narrow, put a wall and soil around it to berm it, have stadium seating. You can still maximize benefits at the park with storage, beneficial for park users. Parks have concerns for recreation requirements (baseball distances). Would make sure minimal impacts on usability of those fields.
- Q (Vanessa): Do you have software to add features in to see the effects of them?

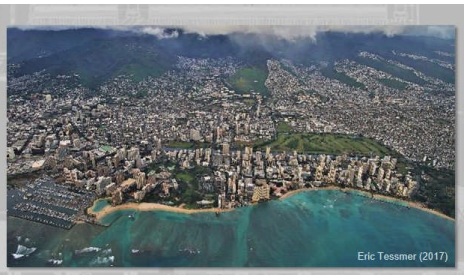
    - A: The team looked at other things other places are using. i.e. Tokyo – billions of dollars tunnel system. Netherlands – floodgates, surge barriers. Those are extremely expensive.

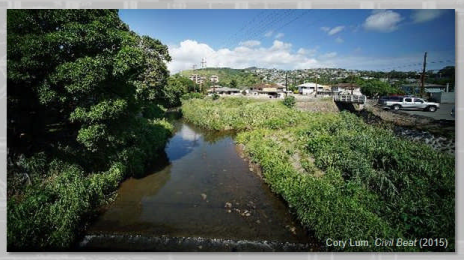
- Q (Dave W): For storage at Ala Wai golf course. The last study had someone from New Orleans advising on the project who was familiar with floodwalls and pumps. Looking up Happy Valley - they have underground detention storage, storing and reusing the water, and flood mitigation at the same time. It is much more costly, but fully automated - they have a control center monitoring the water level. We're always looking at cheapest way possible, and we get the worst product. Waikiki does a lot for our economy, worth billions of dollars. $345M on last project is peanuts compared to rail (HART). We need to do something that is first class in a way that satisfies everyone. Do it the right way that's non-invasive and solves the problem. Why stop short at a 25 year storm when we want the 100 year storm? We're still looking at doing it the cheapest way possible, there's nothing high tech with earthen dams.
    - A: We're working hard to get you the best outcome.
- Q (Dave W): Ecosystem restoration was removed back in 2013 and the study shifted focus to flood mitigation. Benefits should be that we incorporate climate change, sea level rise. With all stormwater systems here along the Ala Wai canal – if a storm comes we're screwed. Put a gate and pump. Then when a flood comes, we have SWIFT tunnels, drain canal lower to create capacity. Capture water further upstream at 50' elevation; berm around Ala Wai golf course, excavate 10-15 feet to increase storage.
- Q: Cost benefit – how much will it cost for each measure? How much cost for a flood gate?
    - A: That will come down to optimization

Attachment 1 – Workshop Presentation Slides

ALA WAI FLOOD RISK MANAGEMENT GENERAL RE-EVALUATION STUDY

WORKSHOP: ALTERNATIVES





US Army Corps of Engineers (USACE)
City and County of Honolulu (CCH)

26 July 2022
*This session is being recorded.

US Army Corps of Engineers

OBJECTIVES

3

1. Rank and provide feedback on initial alternatives.
2. Generate additional, community-preferred alternatives.
3. Explain plan formulation process.
4. Provide up-to-minute update on technical analysis.
5. Preview future opportunities for additional input.

TODAY'S AGENDA

4

1. Introduction (10 min) ← You are here!
2. Opening Remarks (10 min)
3. Presentation: study update and plan formulation (30 min)
4. Workgroups: rank proposed alternative plans (45 min)
5. Report-outs to large group (15 min)
6. Workgroups: generate your preferred alternative (45 min)
7. Report-outs to large group (15 min)
8. Wrap-up (10 min)

(3 hours total)

REVIEW: COMMUNITY INPUT

1. Nov 2021: Scoping Workshops (x 2)
2. Jan 2022: Information Forum
3. April 2022: Sub-basin Workshops (x 4)
4. **July 26, 28, 2022 (T, Th): Alternatives Workshops**

- 12.5 hours of public meetings thus far
- Over 270 participants in first seven public meetings
- 223 total management measures (~200 suggested by public)
- 168 Crowdsource Reporter comments
- Dozens of emails to AlaWai@honolulu.gov

- More opportunities to come

HOSTS & DISCUSSANTS

Presenters (USACE):
- **Cindy Acpal**, Project Manager
- **Eric Merriam**, PhD, PMP; Planner; *Study Lead*
- **Kelley Philbin**, PE; Engineer; *Technical Lead*

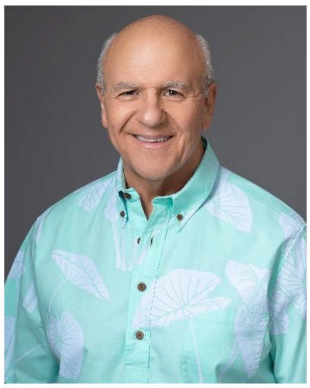
MC / Lead Facilitator (USACE):
- **Tyson Vaughan**, PhD; Sociologist

Additional Facilitators (USACE):
- **Zack Hartley**, Planner; *Lead Economist*
- **Vera Koskelo**, Public Involvement Specialist

Discussants (CCH):
- **Haku Milles**, PE, LEED AP; Deputy Director, Dept. of Design and Construction
- **Matthew Gonser**, AICP, CFM; Chief Resilience Officer, Office of Climate Change, Sustainability and Resiliency
- **Laura Thielen**, Director, Dept. of Parks and Recreation
- **Dawn Szewczyk**, PE; Director & Chief Engineer, Dept. of Facility Maintenance
- **Warren Mamizuka**, Deputy Director, Department of Facility Maintenance
- **Tyler Sugihara**, PE; Chief of Road Maintenance, Dept. of Facility Maintenance
- **Randall Wakumoto**, PE, Program Administrator, Storm Water Quality Division, Department of Facility Maintenance
- **Greg Tsugawa**, Dept. of Transportation Services, Regional Planning Branch
- **Peter Garino**, Dept. of Transportation Services, Performance and Business Analysis Branch

OPENING REMARKS

Mr. **Rick Blangiardi**,
Mayor, City and County of Honolulu

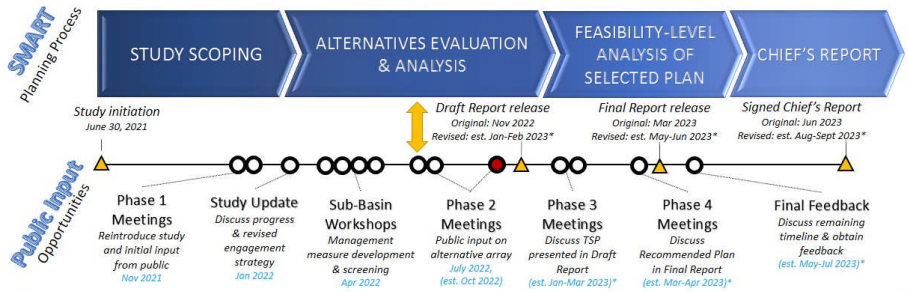


LTC **Ryan Pevey**,
Commander, Honolulu District,
US Army Corps of Engineers

GROUND RULES: PRESENTATION

1. Post comments and questions in the chat or hold until breakouts.
2. Keep your audio on mute during the presentation.
3. If you are having technical difficulties, let us know via the chat and/or email to Tyson Vaughan: Earl.T.Vaughan@usace.army.mil.

STUDY PROCESS & TIMELINE

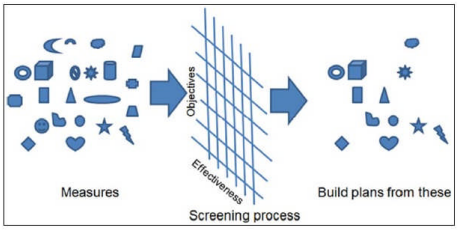


Study schedule delayed ***at least*** 2 months. Revised schedule being finalized and subject to change.

Effects of schedule delays on public input and engagement:
- July 2022 meetings now focused on ***initial alternatives*** not final alternatives.
- Additional time to engage and provide comments/feedback on plan development.
- Potential for additional virtual meetings to discuss final array of alternatives.

PLAN DEVELOPMENT: MEASURE SCREENING

Screening/tiering criteria:
- Study Authority – Is it within study authority?
- Technical Feasibility – Is it technical feasible?
- Effectiveness – Extent it would reduce life risk and/or economic damages.
- Efficiency – Expected cost-effectiveness.
- Environmental Effects – Benefits/impacts.



Existing models/data: water volumes, expected damages, high-level costs

Tiering to prioritize analyses:
- Tier 1: Highest analytical priority. Results could screen other measures.
- Tier 2, 3: Assessed after Tier 1 measures.

Tiering is not a hierarchy of importance or preference. Allows team to maximize efficiency. All measures will be assessed.

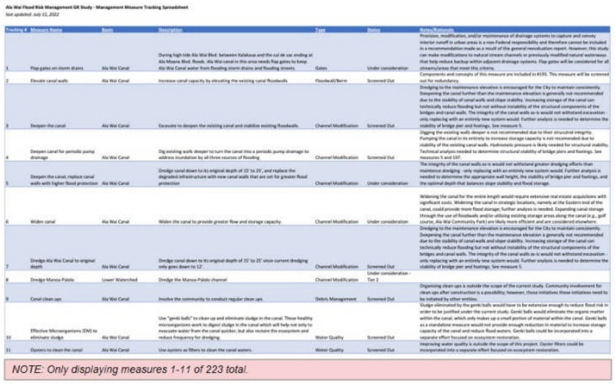
PLAN DEVELOPMENT: MEASURE SCREENING

Management measure tracker:
- Available at:

  https://www.honolulu.gov/alawai/resources.html

- Updated prior to public meeting
- Focused, real-time feedback on technical & planning process

223 measures being tracked
- 172 screened from further consideration
- 51 still under consideration



PLAN DEVELOPMENT: MEASURE SCREENING

Measure Type	Count
Bridge Modification	1
Bypass	5
Channel Modification	8
Channel Naturalization	1
Dam	1
Detention	14
Floodwall/Berm	4
Gates	2
Impervious Surface Reduction	1
Nonstructural (Elevation, Floodproofing, Relocation, Warning/Planning)	4
Pumps	3
Reforestation	1
Tunnel/Conduit	5
No Action	1
Total	*51*

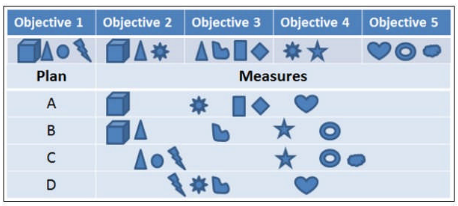
PLAN DEVELOPMENT: FORMULATION

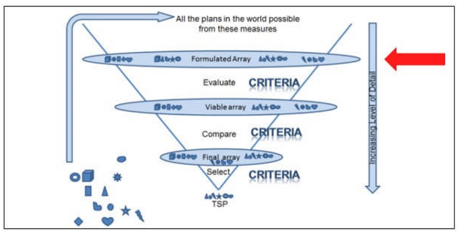
<u>Plan Formulation</u> – combining measures to make plans that meet study objectives

Large number of management measures and possible combinations requires deliberate process to formulation

Formulation is an iterative process. Successive iterations increase in detail.

Today, we will be discussing results of the first iteration – the <u>initial</u> array.





PLAN DEVELOPMENT: FORMULATION

Plan Form Strategy: Cornerstone strategy (aka First Added)
- Identify the 'most important' measure (i.e., cornerstone) for each plan.
- Add additional measures to cornerstones to meet objectives.
- Allows each 'type' of measure to be the focus of a plan.

Initial Array Cornerstones
1. Storage cornerstone
2. Modified conveyance cornerstones
   A. Existing infrastructure / bypasses
   B. Floodwalls
   C. 2nd outlet / daylight
3. Tunnel cornerstone
4. Natural and nature-based cornerstone
5. Hybrid/combined cornerstone
6. No action

PLAN DEVELOPMENT: FORMULATION

Plans represent results of 1st of several iterations of the plan formulation process.

Plans presented today will be refined and reorganized based on additional technical analysis and public input/feedback.

Final recommendation likely not included in the initial array.

Measures and plans presented today are conceptual and will be refined during subsequent iterations.

Nonstructural plan will be more fully developed during the next iteration.

INITIAL ARRAY: ALT 1 – STORAGE

Storage Cornerstone:
1. Makiki District Park Detention
2. Manoa District Park Detention
3. Ala Wai Golf Course Detention

Additional Measures:
4. Kaimuki High School Storage
5. Woodlawn Floodwall & Channel Mod. OR Woodlawn Floodwall & Bypass
6. Woodlawn Bridge Modification
7. Koali Road Floodwall
8. Kanaha Floodwall
9. Ala Wai Canal Floodwall
10. Palolo District Park Channel Mod.
11. Pumps/other structures (flap gates) (not shown)
12. Nonstructural to reduce residual risk (not shown)

INITIAL ARRAY: ALT 2A – BYPASSES / EXISTING INFRASTRUCTURE

Cornerstone:
1. Piikoi Street Bypass
2. Woodlawn Bypass
3. Kapahulu Bypass
4. Fort Derussy Bypass
5. Saratoga Bypass
6. Paki Ave Bypass

Additional Measures:
7. Kanaha Floodwall
8. Daylight Makiki Stream
9. Manoa District Park Detention
10. Woodlawn Floodwall
11. Koali Road Floodwall
12. Ala Wai Canal Floodwalls
13. Canal Dredging (Ala Wai, Manoa-Palolo)
14. Palolo District Park Channel Mod.
15. Pumps/other structures (flap gates) (not shown)
16. Nonstructural to reduce residual risk (not shown)

INITIAL ARRAY: ALT 2B – FLOODWALLS

Cornerstone:
1. Kanaha Floodwall
2. Woodlawn Floodwall
3. Koali Road Floodwall
4. Ala Wai Canal Floodwalls

Additional Measures:
5. Kapahulu Bypass
6. Fort Derussy Bypass
7. Saratoga Bypass
8. Canal Dredging (Ala Wai, Manoa-Palolo)
9. Pumps/other structures (flap gates) (not shown)
10. Nonstructural to reduce residual risk (not shown)

INITIAL ARRAY: ALT 2C – 2ND OUTLET

Cornerstone:
1. 2nd Canal Outlet

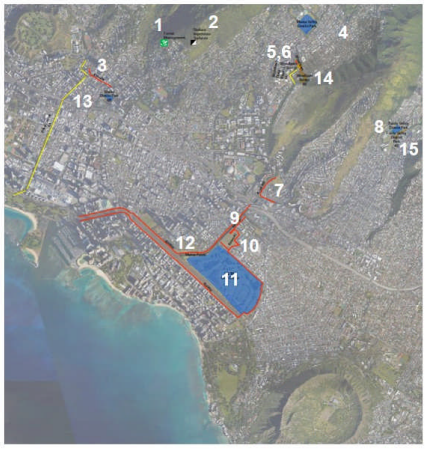
Additional Measures:
2. Kanaha Floodwall
3. Woodlawn Floodwall & Channel Mod.
4. Koali Road Floodwall
5. Ala Wai Canal Floodwalls
6. Pumps/other structures (flap gates) (not shown)
7. Nonstructural to reduce residual risk (not shown)

INITIAL ARRAY: ALT 3 – TUNNELS

Cornerstone:
1. Makiki Tunnel
2. Manoa Tunnel
3. Palolo Tunnel

Additional Measures:
4. Woodlawn Floodwall
5. Ala Wai Canal Floodwalls
6. Pumps/other structures (flap gates) (not shown)
7. Nonstructural to reduce residual risk (not shown)

INITIAL ARRAY: ALT 4 – NATURAL & NATURE-BASED



Cornerstone:
1. Forest Management
2. Reduce Impervious Surfaces

Additional Measures:
3. Kanaha Floodwall
4. Manoa District Park Detention
5. Woodlawn Floodwall
6. Woodlawn Bridge Mod.
7. Koali Road Floodwall
8. Palolo District Park Detention
9. Canal Dredging (Manoa-Palolo)
10. Kaimuki High School Storage
11. Ala Wai Golf Course Detention
12. Ala Wai Canal Floodwall
13. Piikoi St Bypass (A) OR Makiki Dist Park Detention (B)
14. Woodlawn Bypass (A) OR Channel Modification (B)
15. Palolo District Park Channel Modification (B)
16. Pumps/other structures (flap gates) (not shown)
17. Nonstructural to reduce residual risk (not shown)

INITIAL ARRAY: ALT 5 – HYBRID/COMBINED PLAN

Cornerstone:
1. Manoa District Park Detention
2. Woodlawn Bypass
3. Ala Wai Canal Floodwalls

Additional Measures:
4. Woodlawn Floodwall
5. Koali Road Floodwall
6. Makiki District Park Detention
7. Kanaha Floodwall
8. Palolo District Park Channel Mod.
9. Pumps/other structures (flap gates) (not shown)
10. Nonstructural to reduce residual risk (not shown)

PLAN DEVELOPMENT: EVALUATION

Evaluation Criteria:

- Completeness: includes all actions needed to realize objectives/achieve effects
- Acceptability: consistency with laws, policy, and regulations
- Efficiency: preliminary cost/benefit analysis
- Effectiveness (life safety): reduced inundation/water velocities, impacts to critical & transportation infrastructure
- Effectiveness (economic damages): reduced inundation, damage estimates
- Environmental effects: qualitative assessment of impacts or benefits
  - e.g., in-stream habitat, marine habitat, water quality, terrestrial habitat, listed species
- Social considerations: qualitative assessment of socioeconomic considerations
  - e.g., Social equity, vulnerable populations, social identity, community cohesion, quality of life

Subsequent plan formulation iterations will modify and combine aspects of each alternative and refine data used for evaluation criterion

POLL: INITIAL ALTERNATIVES ARRAY

1. Storage
2. Other Structural Measures
   a. Bypasses / Existing Infrastructure
   b. Floodwalls
   c. Second Canal Outlet
3. Tunnels
4. Natural and Nature-Based Cornerstone
5. Hybrid / Combined Plan
6. No Action

WORKGROUPS

Webex main room. (here)
Facilitator: Vera Koskelo

Discussion group 1.
Facilitators: Tyson Vaughan and Kelley Philbin (technical lead)

Discussion group 2.
Facilitators: Eric Merriam (study lead) and Cindy Acpal (project manager)

Discussion group 3.
Facilitator: Zack Hartley (planner, lead economist)

45 minutes; random assignment

GROUND RULES: WORKGROUPS

1. Please stay on task.
2. Post comments and questions in the chat or use the “raise hand” tool.
3. Keep your audio on mute unless speaking.
4. Introduce yourself briefly the first time you speak.
5. When speaking, be conscious of acronyms and technical language.
6. Be mindful and help ensure that everyone has a chance to speak.
7. Send additional thoughts, questions and suggestions to AlaWai@honolulu.gov.

FIRST WORKGROUP SESSION

1. Rank the alternatives presented today.

2. Provide feedback on alternatives:
   a) Why did you rank them this way?
   b) Why do you prefer some over others?
   c) What do you like or dislike about any/all of the alternatives?

WORKGROUPS REPORT-OUT

1. Report your group’s rankings of the alternatives.

2. Briefly describe reasoning, likes and dislikes.

5 minutes each group

SECOND WORKGROUP SESSION

1. Generate **your own** preferred alternative plan based on the 51 management measures still under consideration.

2. Explain your reasoning behind your alternative plan.

MANAGEMENT MEASURES LIST

Upper Watershed
- Bridge bypass and debris
- Detention basins
- Forest management

Manoa
- Woodlawn Bridge bypass box culvert
- Woodlawn Drive Bypass
- Manoa Channel Modification
- Kanewai Underground Storage
- Manoa Valley District Park Detention Pond
- Koali Rd Floodwall
- Woodlawn Bridge Floodwall
- Subsurface Kanewai Tunnel

Makiki
- Piikoi Bypass
- Modify Makiki Stream entry angle
- Daylight streams
- Makiki District Park and Tennis Courts detention pond
- Floodgate & bypass OR floodgate & pumps at Makiki Confluence
- Makiki Tunnel System

Palolo
- Modify Palolo Stream entry angle
- Palolo Channel Modification
- City Mill Culvert detention
- Palolo Park detention basin
- Palolo pipe within culverts

Lower Watershed
- Dredge Manoa-Palolo
- Kapiolani Park detention basin
- Add pump to McCully-Moiliili storm drainage system

Ala Wai Canal
- Paki Ave Bypass
- 2nd canal outlet (open)
- Deepen canal, replace/raise walls
- Widen canal
- Golf course detention basin (incl. excavation)
- Golf course underground parking structure
- Kaimuki High detention basin
- Ala Wai Canal floodwall system
- Ala Wai Canal surge barrier gates
- Flap gates on storm drains
- Ala Wai Canal pump station(s)
- Microtunnel through Waikiki

Watershed-Wide
- Bridge modification
- Basement parking structure detention
- Redetention
- Storage tunnels
- Underground detention (fields)
- Underground detention (parking lots)
- Berms around all schools
- Reduce hardcover and impervious surfaces
- Emergency preparedness plans
- Flood warning system
- Physical non-structural measures
- Risk communication / education
- Diversion tunnels
- SWIFT tunnels

- No action / do nothing

WORKGROUPS REPORT-OUT

1. Briefly describe your own alternative plan.
   a. What management measures does it feature?
   b. How does it work?
   c. Why is it a good/superior plan?

5 minutes each group

WRAP-UP: NEXT STEPS

- Thursday: in-person workshop at Ala Wai Golf Course Ballroom, 5:30-8:30 HST
- Email the project team: AlaWai@Honolulu.gov.
- Check the project website: https://www.honolulu.gov/AlaWai.
  - Sign up for additional meeting notifications
  - Comment form
  - Continuously updated FAQs
  - Follow the management measure and alternative plan tracker

MAHALO

Thank you for your participation!
See you again soon!

Attachment 2 – Workshop Chat Comments

Main Room

- 5:31:32 PM from Greg Tsugawa to everyone:
  Greg Tsugawa, City and County of Honolulu, Department of Transportation Services
- 5:31:42 PM from Matthew Gonser to everyone:
  https://www.honolulu.gov/alawai
- 5:31:45 PM from Thomas to everyone:
  Thomas Takeuchi, Drainage Engineer, City & County of Honolulu, Dept. of Facility Maintenance
- 5:31:48 PM from Elton Fukumoto to everyone
  Elton Fukumoto, Manoa resident
- 5:31:55 PM from ken to everyone:
  Ken Kaneshiro - Center for Consevation Research & Training, UH Manoa
- 5:31:58 PM from Yvonne to everyone
  Yvonne Chan, ‘Iolani School
- 5:32:03 PM from Haku Milles to everyone:
  Haku Milles, City and County of Honolulu - Department of Design and Construction
- 5:32:06 PM from Benjamin Reder to everyone
  Ben Reder, Deputy Chief, USACE
- 5:32:32 PM from melvia kawashima to everyone:
  Aloha from Councilman Calvin Say's office-he's on Ala Moana Neighborhood Board Mtng tonight...
- 5:32:34 PM from Glenn Otaguro to everyone:
  Glenn Otaguro, resident of Manoa Valley, stakeholder of Manoa Stream
- 5:32:35 PM from Dave Watase to everyone:
  Instead of going 1/4 mile into the ocean, use the $80 million in savings to run a tunnel to the Ala Wai Harbor. As a backup, the tunnels would converge at the Ala Wai Golf Course which could be used as a detention basin for storm larger than what the tunnels could handle. I'm thinking we could have done it with the funds that were previously appropriated. and without the need for upstream detention basins, high walls and berms around the Ala Wai Canal. Pumping station could be added for further benefit when funds are available.
- 5:33:17 PM from Minerva Anderson to everyone:
  Minerva Anderson - Chief of Public Affairs USACE Honolulu District
- 5:33:38 PM from Winston Welch to everyone:
  Winston Welch, Executive Director of The Outdoor Circle and NB #5 Board Member
- 5:33:47 PM from Nathan Serota to everyone:
  Nathan Serota parks & Recreation
- 5:34:21 PM from Amy Bugala to everyone:
  Amy Bugala - USACE Honolulu District, Deputy Chief of Public Affairs
- 5:36:14 PM from Dave Watase to everyone:
  From a sea level rise and sustainability perspective, the only way to protect our existing stormwater infrastructure is to build a permanent flood gate near the Ala Moana Blvd Bridge and then to pump out all our storm drainage. At high tide many of our storm

drainage outlets are almost all under water along the Ala Wai Canal. Eventually, we will have to "wall" off the Ala Wai Canal and use it as a collection basin for our flood waters. Otherwise, we will have to have backflow protectors on every single storm drainage outlet and add pumps to each one which is crazy.

- 5:37:55 PM from Tyson Vaughan to everyone:
  Tyson Vaughan, sociologist, USACE. Earl.T.Vaughan@usace.army.mil
- 5:42:44 PM from Kimo to everyone:
  How can you evaluate the effectiveness of the management measures when you have not told us what kind of storm you are addressing (one-year? two-year? five-year? ten-year? 20-year? 50-year? 100-year?). You need to be transparent about the criteria you are employing. To delay choosing what storm you are using to evaluate the management measures until later creates an appearance of putting your thumb on the scale.
- 5:42:57 PM from Matthew Gonser to everyone:
  Management measures and presentation materials are currently both avaiable at the top of the project hompage: https://www.honolulu.gov/alawai.
- 5:44:15 PM from Kelley Philbin to everyone:
  Kimo - Please refer to FAQ #1 on the honolulu website for this project. https://www.honolulu.gov/alawai/faq.html
- 5:45:10 PM from Kelley Philbin to everyone:
  "Unlike the previous study, the GR study will not target a specific level of flood protection (i.e., the 100-year flood). Rather than focusing on a pre-determined level of protection, the current study will identify the optimal level of protection by developing and comparing numerous alternatives under a range of potential flood events or levels of protection (i.e. 2 year, 5 year, 10 year, 25 year, 50 year, 200 year, 500 year, etc.) and selecting the alternative that provides the greatest net flood risk management benefit. Put simply, the process of technical analysis will reveal what level of protection ultimately yields the "greatest bang for the buck." Generally, the selected plan provides the greatest return on investment to the national taxpayers. This plan is often called the National Economic Development (NED) Plan and represents the plan that provides the optimal level of flood risk reduction while maximizing stewardship of taxpayer dollars...."
- 5:45:15 PM from Sidney Lynch to everyone:
  So is under consideration same as Tier 3?
- 5:45:18 PM from Kelley Philbin to everyone:
  "... This plan is often called the National Economic Development (NED) Plan and represents the plan that provides the optimal level of flood risk reduction while maximizing stewardship of taxpayer dollars. Economic benefits generally represent the reduction in future flooding-related damages and recovery costs due to the proposed project; however, the study will also assess non-economic benefits, including improved life safety, environmental benefits, and other social benefits."
- 5:45:26 PM from Kimo to everyone:
  Ya, I've read that. That is troubling. Some management measures are more effective in addressing a 2-year storm than a 100-year storm. So how did you narrow down any measures when you don't know what storm you are addressing? Or are you looking at all storms?
- 5:45:53 PM from Kelley Philbin to everyone:
  Kimo - We are looking at all storms.

- 5:46:40 PM from Kelley Philbin to everyone:
  Sidney - "under consideration" has several sub-categories. Tiering is for modeling purposes. a Tier 3 is under consideration.
- 5:46:46 PM from Kimo to everyone:
  So are you using numerical criteria? Is decisionmaking criteria a black box?
- 5:47:09 PM from Haku Milles to everyone:
  https://www.honolulu.gov/rep/site/ddc/ddc_docs/Management_Measures_still_under_consideration_July_2022.pdf
- 5:47:50 PM from Kelley Philbin to everyone:
  Kimo - We are using hydraulic modeling to identifiy the reduction in water surface elevations and reduction in inundation to determine effectiveness. We are also using other criteria to help screen measures.
- 5:48:14 PM from Tyson Vaughan to everyone:
  Kimo, the idea is to figure out where is the sweet spot in terms of bang for buck. Is that the 50-year event? 25? The analysis will tell us.
- 5:48:48 PM from Tyson Vaughan to everyone:
  But even then, that will only inform options. Not dictate plans.
- 5:48:50 PM from Kimo to everyone:
  So for that hydraulic modeling, you are looking at all storms???? So you decide that a measure is not sufficiently effective with respect to all storms?
- 5:49:38 PM from ken to everyone:
  The key issue with considering the 223 issues that have been identified by the community is that while these are important issues, by listing them and discussing these separately, it is not conducive to a more holistic, integrative systems thinking approach in formulating strategic solutions in addressing all of these issues.
- 5:49:42 PM from Kelley Philbin to everyone:
  We are modeling all storms and looking if it is effective at any of those storms. Not all.
- 5:51:15 PM from Kimo to everyone:
  My concern is that you folks are going to reject the measures that reduce the amount of runoff (forest management; reducing hardcover) because it does not provide sufficient effectiveness. But you have not told us before running the models, what "objective" measures you are going to use ahead of time as a criterion.
- 5:52:42 PM from Tyson Vaughan to everyone:
  I think reducing runoff is one way that a measure could be effective.
- 5:54:08 PM from Steve Holmes to everyone:
  500??????
- 5:54:41 PM from ken to everyone:
  Glad to hear that ecosystem restoration to reduce runoff would be considered as part of the solution.
- 5:55:27 PM from Sidney Lynch to everyone:
  Is there a money target in mind ie what kind of flood control can you get for x # of $?
- 5:55:49 PM from Tyson Vaughan to everyone:
  That is absolutely something we're looking at, Ken
- 5:58:55 PM from ken to everyone:
  Great! this is not something we have been hearing in previous sessions!

- 5:59:44 PM from Zachary Hartley to everyone:
  Hi Sidney, yes, we currently have preliminary estimates for the maximum total project cost for each of the subbasins and the watershed as a whole. These estimates are going to be refined as we continue through the study process and are currently being used in our evaluation.
- 6:00:35 PM from Sidney Lynch to everyone:
  Thx for the reply Zach. Can you share those estimates?
- 6:00:51 PM from Glenn Otaguro to everyone:
  There should really have a detention basin further upstream from the Manoa District Park detention. Flooding did occur above Kahaloa Bridge
- 6:01:56 PM from Sidney Lynch to everyone:
  Eric your explanations are great! Really appreciate them
- 6:02:01 PM from ken to everyone:
  Again, wouldn‘t a lot of the anticipated inpact on the different areas being discussed as storage measures change as actions are implemented in the upper watershed regions if a systems approach is implemented?
- 6:02:04 PM from Tyson Vaughan to everyone:
  Good comment, Glenn. We are capturing this chat and taking notes!
- 6:03:07 PM from Winston Welch to everyone:
  Would Kapahulu Bypass be a large tunnel under the street starting at City Mill or so?
- 6:03:11 PM from Glenn Otaguro to everyone:
  This is no the first time that I've mentioned this in the Ala Wai meetings
- 6:03:38 PM from ken to everyone:
  Debris detention basins which will disrupt the natural functioning of the watershed ecosystem may not be necessary if the source of the debris, e.g., the albizia, is part of the plan.
- 6:04:07 PM from Tyson Vaughan to everyone:
  Ken, totally agree, the final plans will need to be systemically sound. What we're seeing here is very early.
- 6:04:46 PM from Glenn Otaguro to everyone:
  Something needs to be done to capture or detain runoff coming down from the storm water drainage ditch before it feeds into Manoa Stream where a 2004 flooding occur
- 6:05:39 PM from Kelley Philbin to everyone:
  winston - the kapahulu bypass is still conceptual, as are all of these measures. In short, yes it conceptually runs down Kapahulu starting around City Mill. Layout and dimensions will change during refinement and optimization.
- 6:05:39 PM from Winston Welch to everyone:
  How deep would a tunnel be under Kapahulu or Paki for example?
- 6:06:51 PM from Kelley Philbin to everyone:
  Winston - The intention for bypasses will use culvert sizing comparable to what is in place already. So no, not large subsurface tunnels for Alt 2A.
- 6:07:15 PM from Laura Ruby to everyone:
  Please Army Corps of Engineers stop the proposed bridge over the Ala Wai Canal as it will likely interfere and obstruct the flood mitigation. The flood control should be the the primary initiative. The brodge proposal is not necessary nor needed and will end up

having hidden costs, including security, costing the C&C and taxpayers way into the future. Please stop the proposed bridge.

- 6:07:51 PM from ken to everyone:
  Good point Winston. Any idea of potential impact on the natural aquifers with any proposal to use tunnels to move flood waters directly into the ocean?
- 6:08:01 PM from Kelley Philbin to everyone:
  ken - debris detention basins are currently not a measure that we have under consideration. We will incorporate debris management within design features as needed. Such as culvert screens, bridge modifications, etc.
- 6:08:43 PM from Zachary Hartley to everyone:
  Hi Sidney. At this time, I would refer you to the documentation related to the last Feasibility Study and post-Feasibility documentation; mainly, the Main Report and Economics Appendix for more insight. The main idea is that areas that are likely to experience high consequences from flooding could likely afford a more expensive measure, or set of measures, to be implemented to reduce flood risk. Our estimates are still very preliminary and mainly meant for internal use at this point.
- 6:08:56 PM from Sidney Lynch to everyone:
  Would the secondary outlet only be 'active' ie letting water out to the ocean during a flood event? Otherwise just bringing fresh water into the canal?
- 6:09:03 PM from Winston Welch to everyone:
  Why would a secondary canal need to travel so far down Paki rather than be under Kapahulu to ocean, which was more of a natural route anyway I believe, but less distance in any event
- 6:09:26 PM from Glenn Otaguro to everyone:
  If the storm water drainage ditch cannot be detained, Manoa Stream needs to be widened to allow a large volume of runoff to flow downstream during a flash flood stage
- 6:09:32 PM from Kelley Philbin to everyone:
  Winston - This is very conceptual in design. The alignment can change.
- 6:09:46 PM from Winston Welch to everyone:
  What heights are proposed for walls along Ala Wai for example?
- 6:10:04 PM from Sidney Lynch to everyone:
  Thx Zach
- 6:10:17 PM from Kelley Philbin to everyone:
  Sidney - The functionality of the 2nd outlet has not been optimized for water quality at this point in the study phase.
- 6:10:21 PM from Kimo to everyone:
  not enough for what kind of storm????
- 6:10:53 PM from Kimo to everyone:
  When you say that the nature-based solution is not enough, what year storm are you using to render that determination?
- 6:11:00 PM from Sidney Lynch to everyone:
  So the secondary outlet would be 'active' only during a flood event to let the water out of the canal thru that outlet - correct?
- 6:11:02 PM from ken to everyone:
  Ok - thanks Kelley. That's what I thought that the detention basins were no longer a part

of hte plan. At the same time, any infrastructure than might be implemented, there must be concern about perturning the natural functioning of the watershed ecosystem.

- 6:11:25 PM from Kelley Philbin to everyone:
  Winston - Height of the canal are still undetermined. This is what we call optimization. Whatever the height is that reduces water surface elevations and provides economic benefits.
- 6:11:33 PM from Kelley Philbin to everyone:
  ** canal floodwall.
- 6:11:59 PM from Kimo to everyone:
  You keep saying that other measures would be needed. Needed to address what year storm???
- 6:12:03 PM from Winston Welch to everyone:
  So....what are ranges that are considered for "optimization?"
- 6:13:20 PM from Kelley Philbin to everyone:
  Kimo - The results will be presented in a paper. The hydrology analysis is still being finalized. The impacts are negligible for any of the events that we compare (2- through 500-yr).
- 6:13:54 PM from Kelley Philbin to everyone:
  Sidney - It is undetermined how it function at this time. Sorry I do not have any other design details as we have not gotten that far in the analysis.
- 6:14:01 PM from Stephanie Ratte to everyone:
  Is size the primary difference between a tunnel and a bypass then? Thank you
- 6:14:01 PM from Zachary Hartley to everyone:
  Sidney, for your reference < https://www.poh.usace.army.mil/Missions/Civil-Works/Civil-Works-Projects/Ala-Wai-Flood-Risk-Management-Project/Feasibility-Study/ >. In the Economics Appendex, Tables B-8 and B-9 will give you a good idea of which areas are expected to experience high damages.
- 6:14:06 PM from ken to everyone:
  There are other technologies that mitigate the need to dredge the canal. E.g., the EM technology which has been shown to bioremediate organic sludge in the canal and if implemented from the top of the watershed, much of the sedimentation and sludge buildup can be significantly reduced.
- 6:14:57 PM from Kelley Philbin to everyone:
  Stephanie - The tunnel is a very large subsurface tunnel, let's say 15 ft diamter and 30-60 ft under ground. The bypasses are smaller culvert.
- 6:15:42 PM from Kimo to everyone:
  Thank you Kelley. I find that hard to believe. I look forward to looking at the hydrological analysis. I hope it explicitly discloses all assumptions that it made.
- 6:17:20 PM from Sidney Lynch to everyone:
  Maintenance of any feature should be considered in the plan development
- 6:17:54 PM from Kelley Philbin to everyone:
  Kimo - Yes it will! We met with Hawaii Green Growth and Stantec to go over previous analyses as well as discuss assumptions and academic papers to reference. We look forward to sharing!

- 6:19:48 PM from Sidney Lynch to everyone:
  on the poll should be able to choose an option with reservations as the categories are so broad
- 6:20:34 PM from Winston Welch to everyone:
  Yes, the poll is a bit limiting/confusing. I'd like to look at the 51 alternatives remaining as a whole.
- 6:20:36 PM from Kelley Philbin to everyone:
  Sidney - We will be able to discuss all of those reservations in the Breakout Groups!
- 6:22:42 PM from Kelley Philbin to everyone:
  Winston - We will take a look at those 51 measures and you'll have an opportunity to provide feedback outside of this meeting as well.
- 7:12:38 PM from Winston Welch to everyone:
  You are double voiced Tyson
- 7:12:59 PM from Melanie Lander to everyone:
  no echo for me
- 7:13:02 PM from Sidney Lynch to everyone:
  hear you fine
- 7:13:06 PM from Laura Ruby to everyone:
  We have over 300 community signers against the NOT pono bridge
- 7:13:15 PM from Haku Milles to everyone:
  If you're not speaking, please mute yourself
- 7:13:21 PM from Sidney Lynch to everyone:
  Yeah - get rid of that bridge
- 7:14:24 PM from bruce black to everyone:
  Bridge not priority.
- 7:15:14 PM from LTC Pevey to everyone:
  Everyone is back!
- 7:15:25 PM from Tyson Vaughan to everyone:
  :-)
- 7:20:54 PM from Ryan Morrissey to everyone:
  What do I need to sign to be #301?
- 7:22:47 PM from Tyson Vaughan to everyone:
  https://www.honolulu.gov/rep/site/ddc/ddc_docs/Management_Measures_still_under_consideration_July_2022.pdf
- 7:23:54 PM from Dave Watase to everyone:
  OceanIt SWIFT report to City Council in September 2020. Page 51, cost $262 million. https://hnldoc.ehawaii.gov/hnldoc/document-download?id=7688
- 7:24:07 PM from Laura Ruby to everyone:
  petition against the NOT pono bridge
- 7:24:21 PM from Laura Ruby to everyone:
  https://www.change.org/p/mayor-blangiardi-the-ala-pono-bridge-is-not-pono?recruiter=43525510&utm_source=share_petition&utm_medium=copylink&utm_campaign=share_petition
- 7:28:18 PM from Keil Anderson to everyone:
  Vera, I can't see a link as you described, to join a breakout

- 7:30:16 PM from Tim Hurley to everyone:
  same here
- 7:44:06 PM from Luciano Minerbi to everyone:
  It seems that Moiliili is not properly mentioned in these slides except in no. 31 also in the press see Hurlkey's article, only because mentioned by Sidney Lynch, while in reality Moiliili is 2 feet lower than Waikiki all along the Ala Wai Canal, so more explict protection meausres for Moiliili are needed. Thanks.
- 7:51:39 PM from Luciano Minerbi to everyone:
  Waikiki immediate tsunami evacuation should be in the upper floor not running in the street as Moiliili is lower than Waikiki, and elevation is far away after the H1 freeway, Monsarrat avenue versus DaimonHead is closer and at higher elevation!
- 8:17:38 PM from Sidney Lynch to everyone:
  Give you all credit, Not easy
- 8:21:48 PM from Sidney Lynch to everyone:
  Been an interesting evening and thanks for letting us all participate and interact with peole from the various valleys with their personal experience.
- 8:22:16 PM from Winston Welch to everyone:
  This meeting tonight felt qualitatively different than before. I felt like you have been listening and thrown out preconceptions. Not knowing all the answers is really respected. Please keep up this involvement with people and minds open to creative solutions.
- 8:22:43 PM from Winston Welch to everyone:
  Thanks to all for your hard work and willingness on this--it is most appreciated.
- 8:25:34 PM from Winston Welch to everyone:
  I'm guessing with the old DDC fellow out and Tyson in, it's helped a lot
- 8:29:04 PM from ken to everyone:
  Agree with Winston that the discussions this evening definitely had a different tone and it appears now that you are beginning to listen to the concerns of the community. Lookkng forward to see what the next iteration of your plan looks like. Mahalo plenty for your efforts.
- 8:30:03 PM from Dave Watase to everyone:
  Thank you for communicating and engaging the community. This process feels so much different than the past efforts. Mahalo!
- 8:30:49 PM from Kahealani Keahi to everyone:
  See you on Thursday. Mahalo! Aloha a hui hou...Maka'ainana ...the eyes of the land are watching!
- 8:31:24 PM from Sidney Lynch to everyone:
  Yes. See everyone on Thurs.
- 8:33:14 PM from Kahealani Keahi to everyone:
  Aloha Dave! Look forward to Seeing you on Thursday!
- 8:33:31 PM from Keil Anderson to everyone:
  thank you!
- 8:33:55 PM from Thomas to everyone:
  thanks fpr the discussion.

Workgroup 1, Breakout Session 1: Feedback on Initial Array

- 6:25 PM from Matthew Gonser to everyone in this session:
  For participants' benefit you can access all the arrays here, pp.17-23:
  https://www.honolulu.gov/rep/site/ddc/ddc_docs/AlaWai_Alternatives_Workshop-220726.pdf
- 6:32 PM from Tyson Vaughan to everyone in this session:
  I see Laura's hand up, and then Winston
- 6:36 PM from Dave Watase to everyone in this session:
  I'm against flood walls around the Ala Wai Canal because they won't work and won't protect Waikiki. Tunnels would bypass the Ala Wai Canal and protect Waikiki. Flood walls require exisiting storm drainage to be capped and will not function. Waikiki flooded this past December in Kalakaua near the Waikiki Shopping Center on a small storm (5-year) and the existing drainage was functional and Kalakaua drains to the Ala Wai Canal. If that was capped, Waikiki would self destruct by its own flood waters.
- 6:36 PM from Matthew Gonser to everyone in this session:
  Then Bruce Black
- 6:38 PM from Winston Welch to everyone in this session:
  hmmmm....just went blank
- 6:38 PM from Winston Welch to everyone in this session:
  OK, I'm back
- 6:38 PM from Ryan Morrissey to everyone in this session:
  I think the flood walls will be vital to the community's survival over the next 100 years to account for expedited water level increases and tidal storm surges.
- 6:40 PM from Ryan Morrissey to everyone in this session:
  Like the berms idea just mentioned, but a rigid wall of some sort must be incorporated to avoid erosion.
- 6:40 PM from Dave Watase to everyone in this session:
  The other thing with flood walls are that they require pumps like as proposed in the 2017 EIS. Pumping stations on the Ala Wai Golf Course and near the Waikiki Library. What was missing were pumping stations near the University Avenue (near the proposed Ala Pono bridge) and either a Makiki Bypass or (Makiki flood gate and pumping station) because that area will be above ground level with flood walls and you would have to prevent backflow up Makiki Stream. Another problem with floodwalls, is that the Haustin Ditch and Detention basin was designed above ground level and would have backflowed and flooded Moiliili. Floodwalls require around 50+ smaller stormdrains outlets along the Ala Wai Canal to be capped. Interior storm drainage nightmare.
- 6:42 PM from Dave Watase to everyone in this session:
  Limit the flood walls and berms to the Ala Wai Golf Course. If water is captured via the tunnels upstream. The berms and flood walls around the AWGC can be above ground increasing the storage if needed.
- 6:43 PM from Ryan Morrissey to everyone in this session:
  Cost .should be considered
- 6:44 PM from Winston Welch to everyone in this session:
  Hey Tyson, can you see me now?

- 6:44 PM from Tyson Vaughan to everyone in this session:
  Yes!
- 6:49 PM from Dave Watase to everyone in this session:
  I like the tunnels. I'd recommend that the Manoa and Palolo tunnels converge at a switching station on the AWGC and have separate tunnels to the Ala Wai Harbor. Going out into the ocean is expensive and environmentally will be a concern. The Ala Wai Harbor is where the flood waters go anyway. So long as there is adequate head pressure and volume flowing in tunnels they can be used with gravity flow. Should the upstream intercepts become empty. A centralized switching station could be combined with a pumping station to pump flood waters from the Manoa and Palolo tunnels. (Catch basins at different locations coud be opened up depending on where the needs are). By centralizing the tunnels to the AWGC would allow excess capacities to be directed to the AWGC detention basin. Berms could be several feet above ground level increasing the capacity 3 times bigger and capture it upstream. This extra detention capacity in the AWGC can compensate for what otherwise require flood walls.
- 6:50 PM from Matthew Gonser to everyone in this session:
  Then Winston
- 6:50 PM from Matthew Gonser to everyone in this session:
  Next comments from: Daisy, Winston, Laura
- 6:51 PM from Tyson Vaughan to everyone in this session:
  Thanks Matt!
- 6:54 PM from Ryan Morrissey to everyone in this session:
  Great comments, 100% this conversation should not only be about storms. Sea level rise should be of greater concern to the community.
- 6:55 PM from ken to everyone in this session:
  I have already expressed my concerns in the chat room during the earlier plenary session and so won‘t take up any more time to bring up these poinst verbally. Just wanted to add that while each of the alternatives might be able to address issues especially in combination with all of the potential alternatives (except for tunnels), it is equally important to consider water quality with the goal to transform one of the most polluted waterways into a "swimmable and fishable" watershed.
- 6:55 PM from Matthew Gonser to everyone in this session:
  Re: sea level rise, please see FAQs # 22 and 25:
  https://www.honolulu.gov/alawai/faq.html.
- 6:55 PM from Tyson Vaughan to everyone in this session:
  Appreciate that, Ken!
- 6:56 PM from ken to everyone in this session:
  Bts, one thing I keep forgetting to ask is whether there is anything being done to monitor the nearshore coral reef ecosystem as an importnat component of what Bruce mentioned, i.e., an Ahupua‘a approach.
- 6:57 PM from bruce black to everyone in this session:
  Sea level raising will be a problem that flood mediation from the sea will be challenging if we hope to maintain waikiki beach....this is why I favor grass berms around the ala wai to accomadate visitors durning king tides.

- 6:57 PM from Tyson Vaughan to everyone in this session:
  We are definitely watching whether any measures would have negative impacts on the reefs or any other parts of the environment.
- 7:00 PM from ken to everyone in this session:
  Ok - great. Have you identified which group or organization which is most knowledgeable about the marine environment to effectively assess the impact of any plan that will eventually be implemented?
- 7:00 PM from Ryan Morrissey to everyone in this session:
  Consider not building the incredibly costly / SF Ala Wai bridge to fund these watershed and sea level rise problems.
- 7:01 PM from Ryan Morrissey to everyone in this session:
  Agreed with what she just said
- 7:02 PM from Kelley Philbin to everyone in this session:
  i think we skipped winston a few times..
- 7:02 PM from bruce black to everyone in this session:
  What is the latest with Top Golf investments into manipulating the golf course as a flood water detention basin?
- 7:02 PM from Tyson Vaughan to everyone in this session:
  Ken, we're coordinating with the City but also the state and other federal agencies. (Sorry, our enviro team member could give you a better and more specific answer, but I do know that there is some coordination.)
- 7:03 PM from Ryan Morrissey to everyone in this session:
  Laura great comments
- 7:04 PM from ken to everyone in this session:
  Tyson, thanks for your response. There are actually a lot of baseline data on the marine environment fronting
- 7:05 PM from Ryan Morrissey to everyone in this session:
  Great idea
- 7:06 PM from ken to everyone in this session:
  Sorry - sent the previous message before I finished. as I started to say, there are already a lot of information about the current status of the coral reef ecosystem fronting Waikiki Beach which would be critical to assess the impact of any component of the "plan".
- 7:09 PM from Dave Watase to everyone in this session:
  $262 million and reduced the 100-year flood to a 25-year flood impacts. Could have been modified to do more and in combination of a Ala Wai Golf Course detention basin.
- 7:09 PM from ken to everyone in this session:
  Be careful about planting trees that may be invasive, e.g., the albizia which is a major problem with flooding issues, etc.
- 7:10 PM from Dave Watase to everyone in this session:
  OceanIt proposed 12' diameter but could have been expanded and extended to intercept higher up the watershed.

Workgroup 1, Breakout Session 8: Generating a Community-Preferred Alternative

- 7:24 PM from Matthew Gonser to everyone in this session:
  For reference, see slide 37:
  https://www.honolulu.gov/rep/site/ddc/ddc_docs/AlaWai_Alternatives_Workshop-220726.pdf
- 7:29 PM from Ryan Morrissey to everyone in this session:
  Phenomenal AWGC water conservation idea
- 7:31 PM from ken to everyone in this session:
  why not just remove the source of the debris.
- 7:31 PM from ken to everyone in this session:
  Perfect Bruce -
- 7:32 PM from Winston Welch to everyone in this session:
  IDk how much time we have on this, but is a yes, maybe, no expedient on all these various topics? Or do we need more discussion? Are you just looking for a straw poll more or less?
- 7:33 PM from ken to everyone in this session:
  Forest and stream management would include removing alien invasice species and stabilizing stream banks, etc.
- 7:33 PM from Tyson Vaughan to everyone in this session:
  Maybe we go person to person and get preferred measures first
- 7:34 PM from Laura Ruby to everyone in this session:
  yes Winston, how much time do we have? We should hit the most imortant items first.
- 7:34 PM from Tyson Vaughan to everyone in this session:
  We have 40 minutes or so
- 7:34 PM from Tyson Vaughan to everyone in this session:
  remaining
- 7:36 PM from Matthew Gonser to everyone in this session:
  Re: forest management in the Ala Wai Watershed, in case folks are unaware, excited to extend DLNR DOFAW's 12/2021 news release announcing a grant to support this work in the watershed: https://dlnr.hawaii.gov/blog/2021/12/08/nr21-224/.
- 7:38 PM from Kelley Philbin to everyone in this session:
  can we annotate on the screen? we may save some time that way
- 7:38 PM from Tyson Vaughan to everyone in this session:
  Yes, we can annotate the screen, but it won't be permanent.
- 7:38 PM from Tyson Vaughan to everyone in this session:
  But we can use it as a starting point
- 7:39 PM from Ryan Morrissey to everyone in this session:
  Considering Flood gates could potential utilized in lieu these pumps discussed here. These are good points though that need to be considered before a wall makes more problems in the near future. But walls are needed long term to save Honolulu. Tunnels seems largely inadequately and damaging to environment during construction, I doubt this can be built without open cut construction methods.
- 7:40 PM from ken to everyone in this session:
  Sorry Dave - have to disagree that watershed restoration and forest management like DLNR is proposing can mitigate flooding events such as what happened during the 25

year rainfall event on Halloween eve 2004. Also, tunnels may be ok if we are assured that the impact underground such as with the aquifers, or other underground infrastrucrure ,etc. plus the quality of the water that would be diverted directly into the marine environment.

- 7:41 PM from Dave Watase to everyone in this session:
  Woodlawn Bypass from one side to the other is a great idea. Woodlawn Drive Bypass to long and the bend is not an issue if you've walked the area.
- 7:42 PM from Dave Watase to everyone in this session:
  Good idea for a subsurface Kanewai tunnel instead of a Kanewai detention basin. The flood walls near Koali St. does make sense or dropping the stream because there is a 10' waterfall near Koali St.
- 7:43 PM from Dave Watase to everyone in this session:
  Makiki Tunnel going down Piikoi is a great idea and more effective than a Makiki District Park Detention basin which is helpful for small floods like a 5-year. The tunnels are flood mitigation measures for bigger storms.
- 7:46 PM from Dave Watase to everyone in this session:
  The Ala Wai Golf Course dwarfs all other detention baisns including the surface area of the Ala Wai Canal.. The Ala Wai Canal is approx 10,000' x 200' wide per foot it can hold 2 million cubic feet. The AWGC could be designed to hold up to 20-50 million cubic feet if captured at a higher elevation and tunneled to the AWGC. Like captured near Kanewai Park.
- 7:49 PM from Dave Watase to everyone in this session:
  The 100-year storm model showed over 300 million cubic feet of in channel storm water that needs to be conveyed to the ocean. That is a huge huge PMount. and even if we had a flood gate and pumping system and lowered the level a head of a storm. We would be able to created maybe 30 million cubic feet of detention in the Ala Wai Canal itself. So, by itself it would not work.
- 7:49 PM from Winston Welch to everyone in this session:
  Ideas to nix: Basement parking structure detention; Golf Course underground parking structure; dredge Manoa-Palolo stream; widen canal; probably nix microtunnels thru Waikiki as well, but keep idea of general drainage thru Saratoga and Ft DeRussy as an option; nix outlet in Kapiolani Park; avoid hard ugly walls of course
- 7:49 PM from Molly Pierce to everyone in this session:
  Just listening in from the City Comms team! Thanks, Matt :)
- 7:51 PM from Stephanie Ratte to everyone in this session:
  Apologies my microphone isn't working!
- 7:51 PM from Dave Watase to everyone in this session:
  The idea of underground bypasses under streets in Waikiki is a good concept. Even a pumping station at the Waikiki Library end and pump the flood water down Kapahulu. (only if Waikiki is threated).
- 7:52 PM from Winston Welch to everyone in this session:
  Agreed Dave....just as long as they work and have redundant systems.....and redundancies to the redundancies
- 7:52 PM from Stephanie Ratte to everyone in this session:
  I think the golf course seems like the most appealing option. But I'm interested in hearing more about the tunnels since it seems to elicit very different responses in terms of

feasibility and cost. Looking forward to learning more about how you will be approaching this possibility

- 7:55 PM from Thomas to everyone in this session:
  DFM did maintain Manoa-Palolo Stream between Koali Rd and Date St last year..
- 7:57 PM from Dave Watase to everyone in this session:
  The Ala Wai Canal has only overtopped twice from meterological events in the 1960's. and from Hurricane Iniki. The Ala Wai Canal is able to handle a 5-10 year storm or 5,000-10,000 cfs. and that is going only one direction toward the Ala Wai Harbor. The 100-year storm will generate flows in the Ala Wai Canal up to 17,000-19,000 cfs. Manoa stream confluence is where the Ala Wai Canal first spills over because it can only dissapate to the Harbor direction. If we even took the EDR's 4000 cfs pump and stuck it at the Waikiki Library and pipe it under Kapahulu Ave. to the ocean (only for the really big storms when Waikik is threatened). it would significanly and almost double the capacity of the Ala Wai Canal. Same as completing the canal with two outlets.
- 7:59 PM from Dave Watase to everyone in this session:
  Use the Ala Wai Golf Course to detain the peak of the bell curve, the volume under the bell curve that the Ala Wai Canal or any other measures like tunnels can't handle.
- 8:00 PM from Winston Welch to everyone in this session:
  One BIG thing is that we really do need to consider sea level rise and how this will incorporate into a larger South-Shore/Urban Core plan on this topic....so that these plans will be easily integrated instead of having to come back in 20 years and redo large parts of this. It's a big chew and probably Matt's office is working on this, but we are still looking at putting major infrastructure in flood zones predicted in less than a decade (train station at Aloha Tower, etc).
- 8:01 PM from Dave Watase to everyone in this session:
  Reduce hard covers and impervious surfaces. Are good for smaller storms but once the ground gets saturated it acts like concrete. Thuse the 40-days of rain and a small 5-year storm flooded Makiki but the duration of a major storm like the 100-yr flood doesn't take that long to saturate the ground.
- 8:01 PM from Rick Egged to everyone in this session:
  Aloha everyone, mahalo for the great discussion.
- 8:01 PM from Winston Welch to everyone in this session:
  I know this has been mentioned by Matt and others, but it should be deliberately and systematically addressed as "Ala Wai Flood Control Component as part of Larger Sea Level Rise/Water Risk Reduction City Plans" or something like that
- 8:01 PM from Rick Egged to everyone in this session:
  I will have to leave now. Rick
- 8:02 PM from Tyson Vaughan to everyone in this session:
  Thanks Rick!
- 8:03 PM from bruce black to everyone in this session:
  Improving and expanding present tunnels are going to have to be a part of the sollution.
- 8:04 PM from Winston Welch to everyone in this session:
  That's true Tyson
- 8:04 PM from Dave Watase to everyone in this session:
  I'm not for hard surfaces but hard surfaces can be beneficial depending where it is. It conveys water faster to the ocean. Hard surfaces for example can move out flood water

in the lower watershed faster before the forest soft surfaces runoff flood waters get to the channels in the lower watershed. In otherwords, drain out the lower watershed to make room for when the flood waters from the upper watershed pass through. Alot of this becomes negliable if you do SWIFT which completely bypasses the Ala Wai Canal.

- 8:04 PM from Winston Welch to everyone in this session:
  SWIFT Tunnels would eliminate or reduce many other needs and issues
- 8:06 PM from bruce black to everyone in this session:
  The bigger issue (Waikiki Flood Mediation)
- 8:07 PM from Dave Watase to everyone in this session:
  The concern with tunnels and as expressed by Winston is that it is a technology that is already in use in Hawaii but mostly with sewer systems. The tunnels can follow government right aways for example under the Ala Wai Canal and following the streams for the major one going up Manoa. Palolo may require going under private properties depending on the route. Makiki can mostly be under Piikoi and Ala Moana District Park and have an outlet at the Ala Wai Harbor.
- 8:07 PM from Dave Watase to everyone in this session:
  OceanIt SWIFT
- 8:07 PM from Dave Watase to everyone in this session:
  https://hnldoc.ehawaii.gov/hnldoc/document-download?id=7688
- 8:08 PM from Winston Welch to everyone in this session:
  Please ensure that any AWGC includes the huge majority of the AWGC
- 8:08 PM from bruce black to everyone in this session:
  Needs to focus on improving the Ala Wai Canel, Golf Course Detention, Grass Brems, Stream Maintence, Education.
- 8:08 PM from Dave Watase to everyone in this session:
  Page 51 is the $262 million cost.
- 8:08 PM from Winston Welch to everyone in this session:
  I'd like to know how much water is needed to be retained, and would a five or ten foot berm around the AWGC hold that volume? Or half of it?
- 8:10 PM from Dave Watase to everyone in this session:
  Of the $262 million around $70 million is to take the Palolo and Manoa tunnels 1/4 miles into the ocean in front of Waikiki. I'm against that and say we save the $70 million and run both tunnels to the AWGC detentin basin with a switching station. Then run one or two tunnels from the AWGC to the Ala Wai Harbor.
- 8:10 PM from Thomas to everyone in this session:
  Are you aware of DLNR's concrete chute project at Woodlawn Drive bridge completed last year to alleviate flooding issues at the bridge?
- 8:11 PM from Winston Welch to everyone in this session:
  I remember Dave saying someting like have Palolo drain down Kapahulu into Golf Course
- 8:11 PM from Dave Watase to everyone in this session:
  For the 100-year flood, yes
- 8:12 PM from Dave Watase to everyone in this session:
  But by itself it reduces the impact from a 100 to a 25 year storm.
- 8:12 PM from Dave Watase to everyone in this session:
  They can be expanded in diameter to accommodate more.

- 8:13 PM from Dave Watase to everyone in this session:
  Kaimuki Detention basin and the Ala Wai Park expansion is not needed if you increase the height of the AWGC berms.
- 8:15 PM from Matthew Gonser to everyone in this session:
  @Laura - Ala Naio Stream?
- 8:15 PM from ken to everyone in this session:
  Also, teh key issues with the SWIFT tunnels is that Oceanit could not respond to the possibilty that the tunnels could impact on the underground aquifers. Hopefully, they have now done the geological studies to know for sure that the freshwater aquifers will not be impacted. The other issues is the quality of the water that is directed into the marine environment.
- 8:15 PM from Dave Watase to everyone in this session:
  Depth of the canal doesn't directly impact the flood flows as the sea level elevation and the canal is tidal influenced is the considered the bottom of the channel from a hydraulics standpoint.
- 8:16 PM from Dave Watase to everyone in this session:
  blockage.

Workgroup 1, Breakout Session 2: Generating a Community-Preferred Alternative, notes

Two alternatives: one SWIFT-tunnel based, the other NNBF-cornerstone with structural elements.

Preferred measures:

Upper Watershed
- Bridge bypass and debris
- Detention basins
- Forest management
- Stream management

Manoa
- Woodlawn Bridge bypass box culvert
- Woodlawn Drive Bypass
- Manoa Channel Modification
- Kanewai Underground Storage
- Manoa Valley District Park Detention Pond
- Koali Rd Floodwall
- Woodlawn Bridge Floodwall
- Subsurface Kanewai Tunnel

Makiki
- Piikoi Bypass
- Modify Makiki Stream entry angle
- Daylight streams
- Makiki District Park and Tennis Courts detention pond
- Floodgate & bypass OR floodgate & pumps at Makiki Confluence
- Makiki Tunnel System

Palolo
- Modify Palolo Stream entry angle

- Palolo Channel Modification
- City Mill Culvert detention
- Palolo Park detention basin
- Palolo pipe within culverts

Lower Watershed

- Dredge Manoa-Palolo
- Kapiolani Park detention basin
- Add pump to McCully-Moiliili storm drainage system

Ala Wai Canal

- Paki Ave Bypass
- 2nd canal outlet (open)
- Deepen canal (maintain more often), replace/raise walls – grass berms
- Widen canal
- Golf course detention basin (incl. excavation)
- Golf course underground parking structure
- Kaimuki High detention basin– with berms
- Ala Wai Canal floodwall system
- Ala Wai Canal surge barrier gates
- Flap gates on storm drains
- Ala Wai Canal pump station(s)
- Microtunnel through Waikiki

Watershed-Wide

- Bridge modification
- ~~Basement parking structure detention~~
- Redetention
- Storage tunnels
- Underground detention (fields)
- Underground detention (parking lots)
- Berms around all schools
- Reduce hardcover and impervious surfaces
- Emergency preparedness plans
- Flood warning system
- Physical non-structural measures (floodproofing, wet and dry; elevation of all or part of structures; relocation, etc.)
- Risk communication / education
- Diversion tunnels
- SWIFT tunnels – modified entry points
- No action / do nothing

Additional suggestions:

- have Palolo drain down Kapahulu into Golf Course
- Incorporate aesthetics
- Bioswales
- Pump clean water into east end of canal
- Or brackish ground water
- Non-structural cornerstone alternative
- *Systemic approach*